Confirmation of the presence of *Geyeria uruguayana* (Burmeister, 1880) in Paraguay, with notes (Lepidoptera: Castniidae)

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Abstract

Two Paraguayan localities expand the known distribution of *Geyeria uruguayana*, and confirm the species presence in the country. Notes on taxonomic history, distribution, biology and ecology of the species are included.

KEY WORDS: Lepidoptera, Castniidae, *Geyeria uruguayana*, distribution, Paraguay.

Introduction

Information about the Castniidae of Paraguay was scarce and scattered until RÍOS & GONZÁLEZ (2011) published a synopsis of the Giant Butterfly-moths known from the country. Twelve species were reported as present in Paraguay, four of which are well known and have been frequently cited in the literature (RÍOS & GONZÁLEZ, 2011; SCHADE, 1925, 1926, 1927, 1930; JÖRGENSEN, 1930). The other eight species listed are known from few specimens. The authors listed four additional species which they considered of probable occurrence in Paraguay.

In this contribution, we confirm the presence in Paraguay of one of these four probable species, *Geyeria uruguayana* (Burmeister, 1880) (RÍOS & GONZÁLEZ, 2011). The confirmation is based on two records: 1) a specimen collected in Laguna Blanca Natural Reserve, San Pedro Department, which is deposited in the Para La Tierra Zoological Collection; and 2) an uncollected (but photographed) specimen from Teniente Enciso National Park, Boquerón Department, in the Paraguayan Chaco.

*Geyeria uruguayana* is poorly represented in collections. Specimen records exist from Argentina, Uruguay, and Southeastern Brazil (MILLER, 1986; PENCO, 2011; PREISS 1899; RÍOS & GÓNZALEZ, 2011), but few specimens are available from each collecting locality. The new records reported here expand the geographical distribution of the species to Paraguay. Further details on the species, collecting sites, and collections where they are to be found are presented herein.
Taxonomic history

Geyeria uruguayana (Burmeister, 1880)
Castnia uruguayana Burmeister, 1880
Castnia uruguayana f. separatula Strand, 1913
Castnia uruguayana cinerascens Houlbert, 1917
Castnia uruguayana f. badariottii Raymundo, 1919
Castnia uruguayana ochreifascia Joicye & Talbot, 1925
Castnia uruguayana champaquiensis Breyer, 1929
Castnia uruguayana rubra Raymundo, 1931
Castnia uruguayana strandi Raymundo, 1931, nom. nud.
Geyeria uruguayana var. badariotti Miller, 1995, missp.
Geyeria uruguayana ochreifascia Miller, 1995, missp.

The species was originally described as Castnia uruguayana by BURMEISTER (1880) from material collected in Paysandú, “Banda Oriental”, Uruguay. STRAND (1913) maintained all Neotropical Castniidae in the genus Castnia s.l. and named form separatula based on a slightly atypical C. uruguayana male of unknown origin. HOULBERT (1917) describes the ssp. cinerascens from material collected in the Eastern Bank of the Uruguay River (Banda Oriental, Uruguay). HOULBERT (1918) included the species decussata Godart, strigata Walker, hubneri Gray and uruguayana within his new genus Ypanema. This genus was later synonymized with Geyeria which was originally proposed by Heinrich Buchecker to include the species decussata, discoidalis Buchecker (= G. decussata) and castnioides Buchecker (= G. hubneri) (BUCHECKER, [1880]; FLETCHER & NYE, 1982; OITICICA, 1955). RAYMUNDO (1919) described the form badariottii based on material collected in Minas Gerais, Brazil. Later, after studying a female collected in Mato Grosso, Brazil, the subspecies ochreifascia was also described (JOICEY & TALBOT, 1925). BREYER (1929) citing “notable differences” with “typical” specimens of G. uruguayana from Uruguay, put forth the ssp. champaquiensis based on material collected in Córdoba, Argentina. MILLER (1986, 1995) recognized three subspecies (uruguayana, champaquiensis and ochreifascia[sic]) in Geyeria uruguayana. However, they were all later synonymized under uruguayana by LAMAS (1995).

Material examined

Data presented as written in the labels of each specimen examined. Additional information is included within square brackets. ARGENTINA: 1 ♂, Cast.[nia] uruguayana Burm, 20 Argentina, Joicye Bequest. Brit.[ish] Mus.[eum] 1934-120 (BMNH); 2 ♀♂, 1 ♂, Goya, [Argentina], Coll. ? (BMNH); 1 ♂, Argentina, Córdoba, R. Foerster leg. (CMZ); 1 ♀, Typus, Castnia uruguayana champaquiensis, Yacanto, Córdoba, Argentina, Cerro Champaquí, Sierras de Córdoba, 2400 m. I-1929, Coll. A. Breyer (MLP) [this specimen is the one illustrated by BREYER (1929)]; 1 ♀, Formosa, Gran Guardia, [Argentina], 11-III-1953, Col. J. Foerster (MLP); 1 ♂, Formosa, Gran Guardia, [Argentina], Col. ?? (MLP); BRAZIL: 1 ♀, Holotype, C.[astnia] uruguayana ochreifascia J. & T., Matto Grosso, Brazil, Ex-Coll. Herbert Druce, Joicye Bequest. Brit.[ish] Mus.[eum] 1934-120 (BMNH); 1 ♀, Neotipo, Castnia uruguayana Burm. f. badariottii Benedito Raymundo, Juiz de Fora, M[inas] G[erais], [Brazil], Coll. B. Raymundo, leg. (MNRJ) [this specimen is illustrated in MIELKE & CASAGRANDE (1986); it was designated Neotype because the specimen originally described by RAYMUNDO (1919; 1930) was not found]; 1 ♂, [São José de] Bôa Vista - Tibagi PR[anã], Brazil, 1000 m., 12-V-2005 (RVC); 8 ♂♂, 3 ♀♀, [São José de] Bôa Vista - Tibagi, 1000 - 1100 m, Paraná, Brazil, XII-1971, Coll. ? (NC); 1 ♂, “30 km L Tibagi - 1050 m”, Paraná, Brazil, 14-XII-2008. Coll. O. & C. Mielke (DZUP); PARAGUAY: 1 ♂, Reserva Natural Laguna Blanca, Departamento de San Pedro, Paraguay, 31-X-2010, Coll. K. Atkinson (CZPLT-E) [this specimen constitutes the first record of the species for Paraguay]; URUGUAY: 2 ♂♂, Paysandú, [Uruguay],
Uruguayana, reçu de M. J. Petit, en Xbre, [October?], 1919 (BMNH); 1 ♂, Castnia uruguayana Burmeister, *Cast.[nia] uruguayana* var. *cinerascens* Houlb., Rep. Argentina, Banda Oriental, [Uruguay] ["Banda Oriental of Argentine" was the name of the region that corresponds with what we know today as Uruguay], coll. E. Kinkelin, ex-Collection Ch. Oberthür (type of *Castnia uruguayana* var. *cinerascens* Houlbert, 1918) (BMNH); 2 ♂♂, Uruguay, Paysandú, I-1930, Col. ?? (MLP); 1 ♀, 111. Uruguay, Rschiv.[?ℑ] (BMNH); 1 ♂, Uruguay, 549, Strecker Colln. 25664, genitalia vial no. M-3788, Jacqueline Miller (FMNH); 1 ♀, Uruguay, 985, Strecker Clfn. 25665 (FMNH); 1 ♂, *Castnia uruguayana*[sic] Bium.[sic], Col. F. Bourquin, Rep. Argentina, Paysandú, [Uruguay]. Slide Nº M-7135, append. Jacqueline Y . Miller (MGCL); 1 ♂, *Castnia uruguayana* Burm., Col. F. Bourquin, Rep. Argentina, Paysandú, [Uruguay], I-30 (MGCL) [These last two specimens have an original Fernando Bourquin label which has “Rep. Argentina” typed below the collector’s name, however the specimens were actually collected in Paysandú, Uruguay which is handwritten by F. Bourquin]; 2 ♂♂, Uruguay, Paysandú, Col. Breyer (MLP); 1 ♂, Uruguay, Paysandú, Col. F. Bourquin (MLP).

Codens of Museums or collections where *G. uruguayana* were found, studied and mentioned here are as follows: BMNH, Natural History Museum, London, U.K.; CMZ, Mateo Zelig Collection, Entre Ríos, Argentina; CZPLT-E, Colección Zoológica de Para La Tierra - Entomology, Laguna Blanca, Paraguay; DZUP, Departamento de Zoología, Universidade Federal do Paraná, Curitiba, Paraná, Brazil; FMNH, Field Museum of Natural History, Chicago, Illinois, USA; MGCL, McGuire Center for Lepidoptera & Biodiversity, Gainesville, Florida, USA; MLP, Museo de La Plata, Buenos Aires, Argentina; MNRJ, Museu Nacional, Rio de Janeiro, Brazil; RVC, Roberto Vinciguerra Collection, Palermo, Italy. NC corresponds to a private collection that we are unable to disclose.

Biology and behavior

It has been previously stated that the flight pattern of this species is “slow and hovering” which is atypical of most Castniidae specimens have also been observed in grassy spots posing with their wings closed (MILLER, 1986, RÍOS & GONZÁLEZ, 2011). Individuals have been observed flying during mid-day, but can also fly at different times of the day if disturbed (MILLER, 1986). BIEZANKO *et al*. (1957) state that the larvae feed on *Eryngium paniculatum* Cav. & Dombeay ex F. Delarocche (Apiaceae). PENCO (2011) and PASTRANA (2004), corroborate this hot, adding that Palms (Arecaceae) are another likely hosts of this borer.

Paraguayan records and distribution

The first record from Paraguay is a specimen (Fig. 1) collected on October 31, 2010, in Laguna Blanca Natural Reserve (S 23° 48´ 45", W 56° 17´ 41"), San Pedro Department, during the ongoing Lepidoptera inventory at the Para La Tierra Ecological Station (PLT). The vegetation here consists of a mosaic of cerrado and degraded patches of Atlantic forest interspersed with semi-deciduous transitional humid-dry gallery forest. (GYRA PARAGUAY, 2008). The four cerrado "ecotopes" described by EITEN (1972, 1978) are all present within the reserve. Unfortunately, the specimen lacks any ecological notes associated with it.

A second Geyeria uruguayana specimen was observed by one of the authors (PS) in Teniente Enciso National Park (S 21° 12' 40", W 61° 39` 21"), Boquerón Department on February 9, 2012. Due to permit restrictions the specimen was photographed but not collected (Fig. 2). The vegetation at this locality consists of low, Dry Chaco thorn forest with a canopy no more than 2.5m high, broken by occasional much larger trees [e.g. quebracho: *Aspidosperma* (Apocynaceae) and *Schinopsis* (Anacardiaceae)] and with a bromeliad (Bromeliaceae) and cacti (Cactaceae) undergrowth. The moth was located on a path through the forest that was lined at either side by a low-growing, moss-like fern. Its flight behavior was notable, with short, erratic flights recalling a
hesperiid that revealed eyecatching glimpses of the orange hindwing and the insect frequently doubled back to retrace the same route. The moth perched on the ground for fairly long periods between flights, with wings folded over the body, but it was not observed feeding (Fig. 2).

Despite the wide geographical distribution of Geyeria uruguayana, precise locality data are limited. Existing specimens do however reveal its presence in a wide diversity of mainly open habitats in southeastern South America (Fig 3). The most northerly record is from an unknown location in the Matto Grosso region, while the easternmost is located around an unspecified site in Minas Gerais, both in Brazil. The Type specimen was collected in Paysandú, close to the most southerly record from Argentina. The two additional localities reported here from Paraguay confirm that the species is more widely distributed than previously thought, and the distance between these two localities is suggestive of a much wider distribution within the country. Furthermore, since the Teniente Enciso record is geographically close to the Bolivian border, and with a similar habitat to that region it seems probable that the species also occurs in Bolivia.

As Paraguay has suffered some of the heaviest environmental intervention in the region and Castniidae are known to be particularly sensitive to habitat destruction (GONZÁLEZ, 2004; LAMAS, 1993; RÍOS & GONZÁLEZ, 2011; VINCIGUERRA et al., 2011), detailed collecting studies are needed in order to clearly establish the real distribution and status of the species. Until these data are available, an effective conservation program cannot be proposed.

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**Figures 1-3.** 1. Male *Geyeria uruguayana*, Laguna Blanca natural Reserve, San Pedro Department, Paraguay. 2. Specimen of *Geyeria uruguayana* perched on ground, Teniente Enciso National Park, Boquerón Department, Paraguay. 3. Map showing localities and ecological regions where specimens of *Geyeria uruguayana* have been collected in Paraguay and neighboring countries: 1, Mato Grosso, Brazil. This is a somewhat uncertain locality that could be either in Pantanal (A) or Cerrado (B); 2, Teniente Enciso National Park, Boquerón, Paraguay. Dry Chaco (D); 3, Juiz de Fora, Minas Gerais, Brazil. Bahia Interior Forest (C); 4, Laguna Blanca, San Pedro, Paraguay. Alto Paraná Atlantic Forest (E), but more accurately Cerrado (B) with degraded Atlantic Forest; 5, São José de Bôa Vista, Paraná, Brazil. Cerrado (B), near Araucaria Moist Forest (K) and Alto Paraná Atlantic Forest (E); 6, Gran Guardia, Formosa, Argentina. Humid Chaco (F); 7, Ponta Grossa, Paraná, Brazil. Araucaria Moist Forest (K); 8, Goya, Corrientes, Argentina. Between Humid Chaco (F) and Paraná Flooded Savanna (G); 9, Champaquí, Córdoba, Argentina. Arid Chaco (I); 10, Canguçu, Rio Grande do Sul, Brazil. Uruguayan Savannah (J); 11, Córdoba, Argentina. Córdoba Montane Savannah (H); 12, Paysandú, Uruguay, Uruguayan Savannah (J).